

# *Disturbance of the Wildlife of the St. Lawrence River*

## *Issue*

*The State of the  
St. Lawrence River*

**Saint-Laurent**  
Vision 2000

Canada

Québec

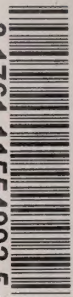
Commercial and industrial activities and recreation are likely to disturb many animal populations because they place humans in or near the wildlife habitats of the St. Lawrence. In the past few years, people have become more interested in nature-related leisure activities. In 1995, 62 percent of riverside residents said that they had participated in at least one activity involving contact with the St. Lawrence (swimming, fishing, pleasure boating, nature watching, hiking). Certain natural disasters can also disturb wildlife, but here we will only be concerned with human-source disturbance.

This fact sheet identifies the main human sources of disturbance along the River and their effects on wildlife, presenting the most important initiatives that have been undertaken in this respect and identifying the actions taken to balance maintenance of human activities with species conservation.

For further information and a more in-depth analysis of the problem, the reader may refer to the reports listed at the end of the fact sheet.

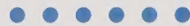
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# Sources of disturbance



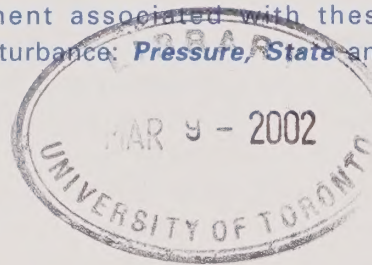
**T**he main human sources of disturbance of wildlife in the St. Lawrence are:

- Marine-mammal-watching cruises<sup>1</sup>
- Commercial shipping and pleasure boating
- Recreational activities on the shore
- The use of gillnets in commercial fishing.

Other sources of disturbance may appear insignificant, but they could be important at the local or regional level. Low-level flights in some areas of the St. Lawrence raise some concerns, as does the harvesting of eider down in the Estuary Islands, or the use of explosives in aquatic habitats, or the removal of eggs and the poaching of certain seabird populations.

The disturbance of wildlife is most likely to occur in those areas of the St. Lawrence where there is a spatial and temporal overlap between a human activity and essential wildlife activities (feeding, breeding, migration). Figure 1 identifies the four main sources of disturbance in the St. Lawrence and shows

those areas where they are likely to be problematic for animal populations. Tables 1, 2 and 3, respectively, provide an overview of each component associated with these sources of disturbance: **Pressure, State and Response.**



1. Only activities practised in the estuary, at the mouth of the Saguenay River, were considered. There are few such excursions elsewhere in the St. Lawrence and they are poorly documented.

## The concept of disturbance

### What exactly do we mean by disturbance?

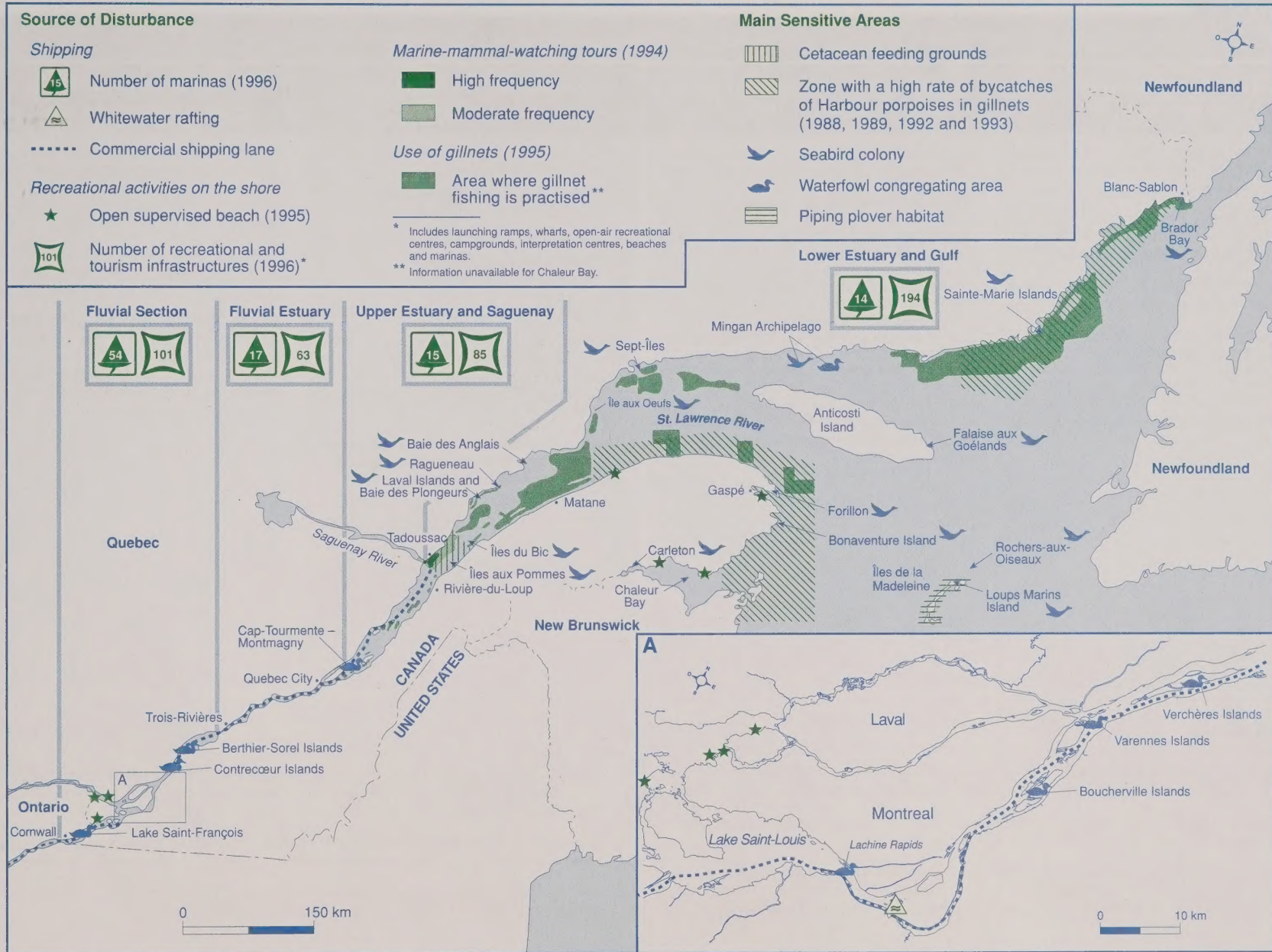
An animal is considered to have been "disturbed" by human activities carried out on or near the St. Lawrence River if these activities interrupt or disrupt the animal's normal behavioural patterns. Harassment is a specific form of disturbance involving deliberate and repetitive actions.

In this fact sheet, the concept of disturbance was limited to human activities of an intermittent or temporary nature. For this reason, certain pressures on animal populations which could have been interpreted as disturbances were omitted. The same was true for changes to and loss of habitat (encroachment, shore erosion, obstacles to fish migration, etc.), the exposure of organisms to contaminants and concentrations in their tissues, and the environmental risks of human activities. Some aspects of hunting and fishing (the presence and the movement of individuals, the noise from firearms) are considered disturbance and are included in the category of "recreational activities on the shore," but the removal of members of natural populations through hunting and fishing is not considered as such. ■



# Disturbance of the Wildlife of the St. Lawrence River

FIGURE 1 Main Human Sources of Disturbance for the Wildlife of the St. Lawrence and Sensitive Areas





**Table 1 Description of Activities**

### Sources of Disturbance

Marine-Mammal-Watching Cruises	Commercial Shipping and Pleasure Boating	Recreational Activities on the Shore	Use of Gillnets in Commercial Fishing
<p>The marine-mammal-watching industry has undergone incredible growth since it first began some 15 years ago.</p> <p>In the St. Lawrence Estuary, the number of cruise boats has doubled in the past six years, from 24 in 1991 to 48 in 1996.</p> <p>There are now more than 7500 cruises each year in the estuary.</p> <p>Demand is still growing, and the existing industry can barely keep up.</p> <p>This industry creates an estimated \$50 million in direct and indirect economic spinoffs each year in the St. Lawrence Estuary.</p>	<p>More than 10 000 commercial ships ply the waters of the St. Lawrence each year.</p> <p>Pleasure boating is a very popular activity. There were 40 754 pleasure craft registered on the St. Lawrence in 1988, up 20.6 percent over 1983.</p> <p>There are high concentrations of small craft in the fluvial lakes of the St. Lawrence, in the Montreal-Sorel stretch, and near some marinas in the estuary.</p> <p>In 1996, there were 100 marinas and 105 wharfs on the St. Lawrence, including 54 marinas in the Fluvial Section. These infrastructures are clearly increasing in number, as there were 88 marinas and 75 wharfs in 1988.</p>	<p>The main recreational activities taking place on the shore are:</p> <ul style="list-style-type: none"> <li>• Hiking, nature-watching and photography</li> <li>• Using the beach</li> <li>• Driving off-road vehicles</li> <li>• Hunting</li> <li>• Sport fishing.</li> </ul> <p>There is little data on the scope of these activities and the location of the busiest sites. Such activities seem to be increasing in popularity along the St. Lawrence.</p> <p>A study estimated that 1.7 million people walked along the River to relax or to enjoy the scenery in 1994.</p>	<p>In 1992, it was estimated that more than 30 000 gillnets were being used in the St. Lawrence in Quebec waters. Fishing effort is currently down because of the moratorium on cod fishing.</p> <p>The location and scope of the fishing effort change often and markedly, depending on the season and the year.</p> <p>In addition to the nets cast by fishers, an unknown number are lost or abandoned each year in the St. Lawrence, where they accumulate. Marine mammals in particular, are at risk of entanglement.</p>

### Comments

- The pressure exerted by shipping and boating activities is difficult to quantify. The impact on wildlife differs depending on the type of craft, its speed and its route.
- Pleasure craft are more likely than commercial ships to end up near important wildlife habitats.
- The noise level of a boat depends on its size and speed. Commercial ships and small craft have different sound frequencies. Nonetheless, the characteristics of noise made by various types of watercraft in the aquatic environment are poorly understood.
- In the Lachine Rapids, the recent development of activities such as whitewater rafting or jet boating and the use of personal watercraft (sea-doo's) is causing concern among the public and wildlife advocates alike.
- It is difficult to assess the scope of the disturbance taking place on the shore, as it is used for various activities at a large number of sites all along the St. Lawrence.
- Some fishers organizations in Quebec guesstimate that as many as 2000 nets are lost each year in the St. Lawrence. This estimate is highly unreliable.



Table 2 Effects on Wildlife

State

Sources of Disturbance			
Marine-Mammal-Watching Cruises	Commercial Shipping and Pleasure Boating	Recreational Activities on the Shore	Use of Gillnets in Commercial Fishing
<p><b>Marine Mammals</b></p> <p>The following effects have been observed:</p> <ul style="list-style-type: none"> <li>• Avoidance or escape behaviour (displacement to other sites, increased dive time and frequency)</li> <li>• Changes in vocal behaviour</li> <li>• Collisions with watercraft.</li> </ul> <p>We do not know what the long-term consequences of these behaviours are on populations in the St. Lawrence.</p>	<p><b>Fish</b></p> <p>No direct effect has been clearly demonstrated. There are probable indirect effects through changes in habitat.</p> <p><b>Birds</b></p> <p>Several studies show that birds are disturbed by shipping activities. Increased predation on young and a drop in reproductive success are the effects most often reported.</p> <p>A study carried out in the Mingan Archipelago from 1994 to 1996 showed that disturbances from boats increase predation on eider ducklings by gulls.</p> <p>A study conducted in 1984 in the Montreal region demonstrated that the distribution of scoups was strongly influenced by the presence of pleasure boaters in Lake Saint-Louis.</p> <p><b>Marine Mammals</b></p> <p>Effects on cetaceans appear to be the same as those caused by whale-watching cruises. There is little data to confirm this hypothesis.</p>	<p><b>Birds</b></p> <p>The disturbance associated with these activities affects mainly shore birds, migrating waterfowl, heron colonies and seabirds.</p> <p><i>In Breeding Grounds:</i></p> <p>The following effects have been observed on various species:</p> <ul style="list-style-type: none"> <li>• Repeatedly flying off</li> <li>• Abandonment of nests</li> <li>• Increased predation on eggs or young</li> <li>• Decrease in parental care</li> <li>• Destruction of nests.</li> </ul> <p>The consequences for the dynamics of the populations concerned have not been clearly established.</p> <p><i>In Migratory Staging Areas:</i></p> <p>A disruption in the energy balance of migrating Greater snow geese has been observed at Montmagny. The amount of time spent feeding decreased as a result of this disturbance, which could have a negative impact on migratory success. Nevertheless, the population is growing and has never been so large. In Lake Saint-Pierre, hunting activities cause waterfowl to relocate to areas inaccessible to hunters and may shorten the stay of certain species in the region.</p>	<p><b>Birds</b></p> <p>No data are available for the St. Lawrence, but there is confirmation that seabirds drown when they get tangled in gillnets.</p> <p>On the coast of Newfoundland, it has been shown that several thousand birds die in fishing nets each year. This is a major cause of death for some populations, particularly murre.</p> <p><b>Marine Mammals</b></p> <p>Drowning in gillnets may be a major cause of death for the Harbour porpoise. The total number of porpoises caught in fishing nets in the St. Lawrence was an estimated 1907 in 1988, 1762 in 1989, and 3650 in 1992 and 1993.</p> <p>The impact on the Harbour porpoise population in the St. Lawrence is unknown.</p>

## Comments

- In other parts of the world, marine mammals have reacted negatively to boats abruptly changing their course or their speed near animals or actively pursuing them. Small craft (particularly personal watercraft) may be more likely to disturb marine mammals because of their greater manoeuvrability. This hypothesis has not yet been confirmed.
- The real impact of whale-watching cruises at sea on whale populations has never been established. At this time, it is impossible to determine the limit beyond which the pressure exerted by a fleet of tour boats changes whale behaviour and visiting patterns, which are the foundation of the industry.
- One to three serious collisions (causing serious injuries or death to an animal) are reported each year between boats and rorquals in the St. Lawrence Estuary. Two Beluga deaths in 1995-96 were also attributed to injuries caused by boat propellers.
- The Canadian Wildlife Service considers that disturbances at or near seabird colonies decreases reproductive success and reduces populations in the long term. The most vulnerable species appear to be the Common murre, the Small Penguin, the Atlantic puffin, and the Common eider.
- Although we do not know the size of the Harbour porpoise population in the St. Lawrence, the number caught in fishing nets, as estimated from surveys of fishers, is worrisome and probably cannot be supported by the population.
- Surveys conducted among fishers in the St. Lawrence and work carried out on the coast of Newfoundland show that cod nets were the cause of most bycatches. The current moratorium on cod fishing is probably keeping this threat at an insignificant level for now.



Table 3 Main Ongoing Initiatives

### Sources of Disturbance

Marine-Mammal-Watching Cruises	Commercial Shipping and Pleasure Boating	Recreational Activities on the Shore	Use of Gillnets in Commercial Fishing
<p>In 1993, Fisheries and Oceans Canada (DFO) issued a <i>code of ethics</i> for pleasure boaters and cruiseboat captains to prevent the disturbance of whales. However, compliance is dropping steadily in the wake of increased competition in the industry over the past few years.</p> <p>The <i>Marine Mammal Regulations</i> prohibit the disturbance or harassment of marine mammals. Ocean monitoring is carried out by the DFO and the Saguenay-St. Lawrence Marine Park (SSLMP). The Regulations are very difficult to enforce in law, particularly since they do not define what constitutes the term <i>DISTURBANCE</i>.</p> <p>The DFO's new <i>Oceans Act</i> provides for the creation of marine protected areas that will protect marine mammals and more effectively control whale-watching cruises.</p> <p>The SSLMP has developed an awareness program to promote respectful whale watching. The process is under way to bring together all stakeholders to set up an integrated strategy for the long-term maintenance of the marine-mammal-watching industry in the SSLMP.</p>	<p>The DFO has developed a code of ethics for pleasure boaters and for the whale-watching industry. However, these guidelines have no regulatory authority.</p> <p>The <i>Marine Mammal Regulations</i> prohibit the disturbance or harassment of marine mammals. Ocean monitoring is carried out by the DFO and the SSLMP. The Regulations are very difficult to enforce in law, particularly since they do not define what constitutes the term <i>DISTURBANCE</i>.</p> <p>Parks Canada has established regulatory measures at some sites, and these are regional in scope:</p> <ul style="list-style-type: none"> <li>At Forillon National Park, personal watercraft are prohibited within a 500-foot-wide riparian strip.</li> <li>In the Mingan Archipelago National Park Reserve (MANPR), access to 13 islands is prohibited during the seabird breeding period (May 1 to August 31).</li> </ul> <p>The DFO's new <i>Oceans Act</i> provides for the creation of marine protected areas that will protect marine mammals and more effectively control commercial shipping and pleasure boating.</p>	<p>In the Iles de la Madeleine, nests built on the busiest beaches have been surrounded by a safety perimeter since 1989 and notices explaining the problem with Piping plovers have been posted. A municipal regulation prohibits motor vehicle traffic on the beaches from June 1 to September 15. Since 1991, only one Piping plover nest has been run over and the number of breeding pairs has risen from 35 to 53.</p> <p>In the MANPR, access to 13 islands is prohibited during the seabird breeding period (May 1 to August 31).</p> <p>The Canadian Wildlife Service (CWS) has set up a network of 28 <i>Migratory Bird Sanctuaries</i> along the St. Lawrence to protect and conserve various species.</p> <p>The Ministère de l'Environnement et de la Faune du Québec has adopted the <i>Regulations respecting the Grande-Île wildlife preserve</i> to protect the heron colony on this island, located in the Sorel island chain.</p>	<p>No measures have yet been taken to minimize the number of marine mammals or birds caught in fishing nets in the St. Lawrence.</p> <p>Surveys of fishers have been conducted regarding bycatches of marine mammals for the 1988, 1989, 1992 and 1993 fishing seasons.</p> <p>An exercise to recover lost or abandoned fishing gear was funded by DFO in the Gaspé North region in 1991. The project confirmed the existence of ghost fishing in the St. Lawrence. No other recovery exercise has since been carried out.</p>

### Comments

- Several players believe that there is more than a reasonable doubt to support the theory that observation activities in their feeding grounds in the St. Lawrence harm the cetacean.
- The MANPR is currently developing an awareness program for sailors (*Programme de sensibilisation au dérangement des oiseaux marins coloniaux et éthique de navigation dans l'archipel de Mingan*).
- To counter disturbance, the CWS is emphasizing the importance of increasing monitoring in *Migratory Bird Sanctuaries* during breeding and rearing periods.
- Estimates of bycatches in fishing nets depend on the voluntary participation of fishers, something that complicates the process of obtaining complete data. Their co-operation remains poor if they receive no benefit from it.



# Summary Analysis

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**T**he concept of disturbance is complex, given the diversity of human activities involved and the species concerned. Depending on the type of disturbance and the species in question, different effects on wildlife may be observed, immediately and in the short or long term. No study has ever shown with certainty the harmful effects of disturbance on the wildlife species of the St. Lawrence. Some immediate reactions have been observed (flight, retreat, avoidance), but the long-term consequences on animal populations are poorly understood. In other words, many **potential** effects are anticipated, but few have been **demonstrated**.

This uncertainty may have important implications for concrete initiatives. It may be difficult to justify such actions in the absence of demonstrated effects on populations. Nevertheless, some initiatives have shown the benefits of acting regardless of scientific proof. The case of the Piping plover in the Iles de la Madeleine is one such example. Protective measures were implemented in 1989 and the subsequent increase in the

population shows that disturbance on the beach was probably quite significant. Such observations underline the importance of a preventive approach to the disturbance problem in cases where the degree of uncertainty is high. In this regard, the **cautionary approach**, which is one of the basic principles underlying the concept of sustainable development, stipulates that: *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.*

The relative importance of the main human sources of disturbance in the St. Lawrence was assessed according to several criteria because priorities for action cannot be based solely on environmental factors, but must consider socio-economic aspects as well. Table 4, which presents a summary of the four main types of disturbance in the St. Lawrence, illustrates the difficulty of attributing more importance to one source than to another, particularly given the wide variety of factors

involved. All sources are important when employing a preventive approach because serious effects on certain populations are anticipated in each case.

However, marine-mammal-watching is the biggest source of disturbance if we consider only the many aspects under the component of **Pressure** (geographical range, intensity of activity, temporal trends and economic importance). The aspects of the **Response** component lead us to the same conclusion, as there is a real need to improve management measures regulating the industry. We reach a different conclusion if we focus the analysis on the **State** component — that is, the effects of disturbance on wildlife species.

We can then conclude that the issue of the use of gillnets is the most worrisome because it can cause the death of the animals in question. Shipping, boating and shore-related activities could also be considered priority, given their demonstrated effects on certain species of birds.

Thus, the importance of the different sources of disturbance is relative and depends on the criteria chosen for decision making. Despite this, **overall, the marine-mammal-watching industry appears to be the source of disturbance on the St. Lawrence that is of greatest concern.** We cannot use the analysis to rank the three other sources of disturbance; they are all considered equally worrisome.



# Disturbance of the Wildlife of the St. Lawrence River

**Table 4 Summary of the Main Problems of Disturbance in the St. Lawrence**

	Sources of Disturbance			
	Marine-Mammal-Watching Cruises	Commercial Shipping and Pleasure Boating	Recreational Activities on the Shore	Use of Gillnets in Commercial Fishing
<i>Pressure</i>				
<b>Geographical Range</b>	In the estuary, particularly at the mouth of the Saguenay; a few cruises in the gulf (Forillon and Mingan).	All along the St. Lawrence; most marinas are located in the river proper (Montreal region).	All along the St. Lawrence; little is known about distribution; no specific data on the use of the riverbanks.	Estuary and gulf.
<b>Intensity of Activity</b>	Very intense activity at the mouth of the Saguenay; 50-some boats offer cruises.	Large concentration of boats in some areas in July and August.	Unknown.	Several thousand gillnets; activity is currently reduced because of the moratorium on cod fishing.
<b>Temporal Trends</b>	The industry has existed for approximately 15 years. It has increased exponentially throughout this time and demand is still rising.	Increase in the number of infrastructures since 1988; probable upward trend in the number of boats over the past 15 years.	Little existing data; probably increasing; in the United States, a 60 percent increase in ten years.	Reduced activity since 1994; could resume in the next few years.
<b>Economic Importance of Activity</b>	Very significant economic spinoffs (more than \$50 million in spinoffs for the region at the mouth of the Saguenay River).	Very significant economic spinoffs across the entire area (several hundreds of millions of dollars per year).	Little is known about the economic spinoffs.	Very significant (and even essential) regional economic activity for communities in the estuary and the gulf; not inconsiderable source of jobs and income.
<i>State</i>				
<b>Species Group(s) in Question</b>	Marine mammals (mainly Fin whales).	Marine mammals, birds and fish.	Birds (shorebirds, waterfowl, seabirds, herons).	Marine mammals (mainly the Harbour porpoise); diving seabirds; unexploited fish species.
<b>State of the Population and Status of Species</b>	Little is known about the populations; species slow to reproduce and therefore fragile; non-resident species except the Beluga; some rare or threatened species (the St. Lawrence Beluga population is endangered and the Fin whale has been designated vulnerable in Canada).	Several species are concerned, including some whose status is worrisome: the St. Lawrence Beluga population is endangered; seabirds are vulnerable because of their biological characteristics (late development and low reproduction rate).	Some species are in trouble (the Piping plover is endangered); seabirds are vulnerable because of their characteristics (late development and low reproduction rate).	Harbour porpoise: population threatened with extinction, number of animals unknown; seabirds are vulnerable because of their characteristics (late development and low reproduction rate).
<b>Type of Activity Likely to be Disturbed</b>	Feeding.	Breeding and rearing of birds, feeding of whales, seal haulouts.	Breeding (nesting and rearing), migration.	Feeding; survival (this type of disturbance causes the death of individuals).
<b>Effects of Disturbance and Ecological Significance for Populations in Question</b>	Behavioural changes observed in the short term (avoidance behaviour); no recognized demonstration of long-term effects.	Decrease in reproductive success in certain bird species; increased predation on young; deaths of marine mammals due to collisions; some areas abandoned by fish.	Decrease in reproductive success and loss in population numbers among some seabird species; changes in the energy balance of migratory birds; displacement of migrating waterfowl and possible decrease in stopover time.	Large number of deaths observed (almost 4000 porpoises per year, according to some estimates; figure unknown for birds); effects on population numbers unknown due to a lack of sufficient data; gillnets may be a major mortality factor.



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	Sources of Disturbance			
	Marine-Mammal-Watching Cruises	Commercial Shipping and Pleasure Boating	Recreational Activities on the Shore	Use of Gillnets in Commercial Fishing

## State (continued)

<b>Cumulative Effects (exposed populations subject to disturbance from other environmental pressures)</b>	POSSIBLE for the Beluga, which is already being exposed to major chemical contamination; other marine mammals are less exposed to contaminants as they are seasonal visitors to the St. Lawrence (except the Harbour seal).	YES: several species are already being exposed to contamination, while others are being hunted (waterfowl) or fished. As there has been a significant loss of historically important habitats, the disturbance of birds and fish in the remaining habitats may be very harmful.	YES: for highly contaminated species and species that are hunted or subject to other forms of disturbance.	POSSIBLE for species of birds exposed to chemical contamination or to other types of disturbance.
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## Response

<b>Existing Management Strategy</b>	Regulation of the industry is poor. There are no specific regulations governing this activity. Primarily public awareness and monitoring measures.	Some sectoral regulations exist, as well as isolated efforts at increasing public awareness.	Protected areas and related regulations; public awareness efforts in some very busy areas.	No existing management measures applicable to bycatches.
<b>Effectiveness of Existing Management Strategy</b>	Not very effective; too much competition within the industry; regulations difficult to enforce in court.	Effective restrictive measures at Forillon and in the Mingan Archipelago National Park Reserve; no overall policy for marinas.	The concept of protected areas is pointless if there are not enough resources to monitor them; these kinds of activities are difficult to manage because they are practiced throughout the area, not just at developed sites.	Not applicable.
<b>Perception of the Public and Other Stakeholders (societal significance)</b>	An increasing number of stakeholders are worried about the industry's growth; the media as well as pressure groups have begun to take an interest in this situation.	A situation that gets little public or media attention, except for specific cases (e.g. Lachine Rapids).	People want increased access to the St. Lawrence for leisure activities. Most people are unaware that they may be disturbing wildlife, except for specific cases (e.g. the Piping plover on the Iles de la Madeleine).	In the maritime regions of the St. Lawrence, where commercial fishing is the basis of the economy, the residents' major concern is re-establishing groundfish stocks and the reopening of the fishery. In this context, catching birds or marine mammals in fishing nets is considered less important.



# Taking Action



**I**t would be unrealistic to seek to completely eliminate all forms of disturbance along the St. Lawrence. Most disturbance-causing human activities are increasing in popularity and generate significant benefits to regional economies. Within a management framework based on sustainable development, environmental objectives<sup>2</sup> must be set for those human activities deemed to be a cause for concern. As part of the preventive approach, the aim of such objectives would be to maintain disturbance-causing human activities while ensuring the conservation of wildlife. As indicated in Table 5, there are no such environmental objectives currently in place, even in the marine-mammal-watching industry, which is the source of human disturbance that is of greatest concern. The pressure exerted by this activity at the mouth of the Saguenay River has been well

documented over the years. Moreover, the public is greatly concerned about this issue, particularly since the continued existence of this important economic activity in the region depends upon maintaining the cetacean populations of the St. Lawrence. A threshold of harmful effects for these ocean-going excursions should be established.

The cautious approach favours an adaptive style of management, which involves making management decisions based on existing knowledge rather than waiting for absolute certainty before acting. This approach does not, however, preclude the acquisition of new data. Our current knowledge only allows us a partial understanding of disturbance, as we have no information on other potential sources of disturbance. The effects of disturbance on some taxonomic groups are also unknown. For these reasons, we must continue to gather more information in order to better define disturbance and all its effects on wildlife.

**Table 5 Environmental Objectives for the Main Sources of Disturbance**

Sources of Disturbance	Environmental Objectives		Comments
	Existing	To be Established	
<ul style="list-style-type: none"> <li>Marine-mammal-watching cruises</li> </ul>	None	Threshold of harmful effects on populations	We need to balance maintenance of the activity with the conservation of populations. Such a threshold cannot be based solely on scientific criteria. The various stakeholders concerned also have to reach a consensus.
<ul style="list-style-type: none"> <li>Commercial shipping and pleasure boating</li> <li>Recreational activities on the shore</li> <li>Use of gillnets</li> </ul>	None	Premature	Priority must be given to learning about the issues before determining the relevance of environmental objectives.

2. An environmental objective is a marker, a threshold or a target relating to a human activity, or to a pressure generated by a human activity, or to an ecosystem component affected by this pressure. The aim of such an objective is to maintain a human activity at a level whereby no serious or irreversible effects are observed on ecosystems; to reduce or limit such pressure to an acceptable level for ecosystems and their associated uses; and to protect, reclaim or restore these ecosystems.



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In addition to setting environmental objectives and acquiring new knowledge, other actions can be envisaged based on the information in Table 6. It presents conclusions on the four main sources of disturbance. This information is separated into four broad categories that, though not exhaustive, correspond to the main fields of activity to be considered to improve the current situation.



Parks Canada, J. Audet



**Table 6 Conclusions and Fields of Activity for the Main Human Sources of Disturbance of Wildlife**

Marine-Mammal-Watching Cruises	Commercial Shipping and Pleasure Boating
<p><b>Public Education and Sensitization</b></p> <ul style="list-style-type: none"> <li>Residents of the estuary region near the mouth of the Saguenay River and vacationers are both aware of the problem of whale disturbance, as evidenced by the large number of complaints received by Fisheries and Oceans Canada (DFO) and Saguenay-St. Lawrence Marine Park (SSLMP) offices each year.</li> </ul> <p><b>Acts, Regulations and Monitoring</b></p> <ul style="list-style-type: none"> <li>This industry is not governed by any regulations specific to the St. Lawrence Estuary. There are no limits on the number of boats that tour companies are allowed to operate, or the territory covered, the period of day or year, the type of craft, boat speed, etc.</li> <li>No training is required to become a captain of a small boat offering whale-watching cruises. As a result, many people who become captains have no prior experience with cetaceans and no knowledge of how to minimize disturbance.</li> <li>The code of ethics excluding Belugas from whale-watching activities, once respected by most members of the industry, is being increasingly disregarded with the creation of new firms and increased competition.</li> <li>The <i>Marine Mammal Regulations</i> are not very effective in protecting whales. Because the term <i>DISTURBANCE</i>, is not defined therein, these regulations are difficult to enforce in court. Moreover, there are not enough officers to adequately monitor the area used by whale-watching boats.</li> <li>There are several Acts to protect species at the federal (<i>Migratory Birds Convention Act, 1994; Canadian Wildlife Act; Fisheries Act; Oceans Act</i>) and provincial level (<i>An Act respecting the conservation and enhancement of wildlife; An Act respecting threatened or vulnerable species</i>). These acts could be used, as needed, to provide the legal framework for the establishment of specific regulations on wildlife disturbance.</li> </ul> <p><b>Permanent or Temporary Protected Areas</b></p> <ul style="list-style-type: none"> <li>Whale-watching activities take place in an area that is part of the SSLMP, whose legal existence has not yet been proclaimed by federal and provincial authorities. This lack of legal recognition is delaying the introduction of regulations specific to the park, which would allow for greater control of whale-watching activities.</li> </ul> <p><b>Research and Knowledge-Acquisition Activities</b></p> <ul style="list-style-type: none"> <li>Knowledge of the biology and ecology of marine mammals found in the St. Lawrence is still not adequate enough to assess the impact of whale-watching activities on these populations.</li> </ul>	<p><b>Public Education and Sensitization</b></p> <ul style="list-style-type: none"> <li>There is no environmental policy common to all marinas in Quebec. As a result, efforts to educate users about the disturbance of wildlife species are sometimes non-existent or vary considerably from one place to another.</li> </ul> <p><b>Acts, Regulations and Monitoring</b></p> <ul style="list-style-type: none"> <li>Personal watercraft are fairly new on the market and their use is fast increasing. Their manoeuvrability and the tremendous noise they make suggest their strong potential for disturbing wildlife. Their use is regulated in Forillon National Park.</li> <li>Non-governmental organizations have repeatedly proposed – including during the <i>International Forum for the Future of the Beluga</i> in 1988 at Tadoussac and during a workshop on the disturbance of Belugas organized by DFO in 1989 – that a moratorium be placed on the construction of new marinas. More recently, the <i>St. Lawrence Beluga Recovery Plan</i>, prepared jointly by DFO and the World Wildlife Fund, recommends that a serious assessment be undertaken of the consequences of any project to build wharfs or marinas in the Beluga's habitat.</li> <li>There are several Acts to protect species at the federal (<i>Migratory Birds Convention Act, 1994; Canadian Wildlife Act; Fisheries Act; Oceans Act</i>) and provincial level (<i>An Act respecting the conservation and enhancement of wildlife; An Act respecting threatened or vulnerable species</i>). These acts could be used, as needed, to provide the legal framework for the establishment of specific regulations on wildlife disturbance.</li> </ul> <p><b>Permanent or Temporary Protected Areas</b></p> <ul style="list-style-type: none"> <li>Some specific regulations may be instituted in protected areas, as has been done at Forillon National Park (personal watercraft must remain 500 feet offshore) and the Mingan Archipelago National Park Reserve (MANPR) (no access to 13 islands during the seabird breeding period).</li> </ul> <p><b>Research and Knowledge-Acquisition Activities</b></p> <ul style="list-style-type: none"> <li>Very little is known about the amount of underwater noise made by various types of boats. Better knowledge of this problem could lead to more enlightened management of nautical activities on the St. Lawrence.</li> <li>There are no data on the effects of disturbance on reptiles, amphibians and semi-aquatic mammals (muskrats, minks, raccoons, beavers, otters).</li> </ul>



## Recreational Activities on the Shore

### Public Education and Sensitization

- Public education is difficult with these types of activities because they can be carried out anywhere along the St. Lawrence and users do not necessarily have a common infrastructure for their activities (unlike pleasure boating). However, increased awareness efforts at some very busy sites, such as provincial and national parks, could reach a large percentage of users.

### Acts, Regulations and Monitoring

- The network of *Migratory Bird Sanctuaries* is a good example of protected areas that safeguard bird populations from disturbance. However, to make sure they are protected, the CWS feels that monitoring in the sanctuaries should be stepped up during the breeding and rearing season.
- There are several Acts to protect species at the federal (*Migratory Birds Convention Act, 1994; Canadian Wildlife Act; Fisheries Act; Oceans Act*) and provincial level (*An Act respecting the conservation and enhancement of wildlife; An Act respecting threatened or vulnerable species*). These acts could be used, as needed, to provide the legal framework for the establishment of specific regulations on the disturbance of wildlife.

### Permanent or Temporary Protected Areas

- It is easier to protect wildlife populations from disturbance within legally protected areas. For example, access is prohibited to 13 islands in the MANPR during the seabird breeding period.

### Research and Knowledge-Acquisition Activities

- Not enough is known about the extent or the characteristics of these activities in the various areas of the St. Lawrence at this time to determine which species are most exposed.
- There are no data on the effects of disturbance on reptiles, amphibians and semi-aquatic mammals (muskrats, minks, raccoons, beavers, otters).



Alain Carpentier



**Table 6 Conclusions and Fields of Activity for the Main Human Sources of Disturbance of Wildlife** *(continued)*

## Use of Gillnets in Commercial Fishing

### Public Education and Sensitization

- No data can be acquired on this problem nor management measures implemented without the co-operation of fishers.

### Acts, Regulations and Monitoring

- There are several Acts to protect species at the federal (*Migratory Birds Convention Act, 1994; Canadian Wildlife Act; Fisheries Act; Oceans Act*) and provincial level (*An Act respecting the conservation and enhancement of wildlife; An Act respecting threatened or vulnerable species*). These acts could be used, as needed, to provide the legal framework for the establishment of specific regulations on wildlife disturbance.

### Research and Knowledge-Acquisition Activities

- There are no data on bycatches of seabirds in gillnets in Quebec.
- Data currently available on bycatches of Harbour porpoise cannot be used to assess the impact on the population in the St. Lawrence.
- An order of magnitude was established of the number of Harbour porpoises caught each year in gillnets, based on the answers of fishers to a questionnaire. The only way to obtain the exact number of bycatches would be to place permanent observers on fishing boats, which is technically unrealistic. The questionnaires appear to be an adequate compromise, since the number estimated using this method in 1992 was very similar to the number obtained by monitoring the activities of 22 fishers that same year.
- The size of the Harbour porpoise population in the St. Lawrence is unknown and surveys are technically difficult to carry out for this species.
- A carcass recovery program, in co-operation with fishers, may provide an opportunity to look for indirect signs of overharvesting of the population.
- The problem of nets being lost or abandoned at sea is not well documented. Its importance could be assessed by setting up a system to keep track of the number of nets lost each year.



Jean Burton



## For more information

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# *The State of the St. Lawrence River*

St. Lawrence Vision 2000 is an action plan governed by a cooperation agreement between the governments of Canada and Quebec. Its aim is to conserve, protect and enhance the St. Lawrence River, with the ultimate goal of returning use of the river to the population. One of the objectives of the action plan is to improve our knowledge of the St. Lawrence River and to disseminate this information to decision makers, riverside communities and the general public.

This approach is reflected in the fact sheets in the series ***The State of the St. Lawrence River***. Its main objective is to collect relevant information about the state of the St. Lawrence in Quebec to provide decision support. The focus is on a series of issues, which are interpreted according to a "pressure-state-response" approach. This approach seeks to identify causal links among the various sources of pressure exerted on the St. Lawrence ecosystem, including natural disasters and human activities, and the state of habitats and resources, and to examine measures taken to counter their effects (existing responses). Each of these environmental issues is the subject of a fact sheet intended for decision makers and those members of the general public for whom the welfare of the St. Lawrence River is a concern. ■



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## *Erratum*

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